
Installation and maintenance

This chapter describes the installation, maintenance, and removal techniques for the MCU/MCA. The final section of the chapter gives troubleshooting advice.

Configuring the V.35

The MCU/MCA is shipped from the factory configured for the RS-232 interface. Configure V.35 in the field at installation time. You must install jumper plugs in either RS-232 or V.35 mode.

To configure the MCA/MCU in V.35 mode, ensure that the subsequent steps are followed:

- 1 Ensure that the MCA/MCU has the jumper plugs in the RS232 mode as shown in **Figure 5**
- 2 Power up the MCU*
- 3 Connect MCA/MCU to the wall jack.
- 4 Press to select **SYNCHRONOUS MODE**
- 5 Press to select synchronous **BAUD RATE**
- 6 Disconnect MCA/MCU from the wall jack.
- 7 Power down the MCU*
- 8 Move jumpers from RS232 sockets to the V.35 sockets as shown in **Figure 5**.

*This step applies to the MCU only.

V.35 and MCA

The V.35 interface can be selected with two DIP jumpers. The V.35 signals appear on the DB-25 connector; an adapter cable is required. The MCA can be placed as far from its associated data terminal or computer port as is consistent with EIA RS-232 or V.35. Jumper plugs on the MCA card may be moved from RS-232 to V.35.

V.35 and MCU

For V.35 interface configuration, remove a 10-pin DIP jumper plug from the MCU RS-232C sockets and install it in the V.35 socket. These sockets are located on the **daughter** board inside the MCU as shown in [Figure 5](#).

Figure 4
MCU daughterboard

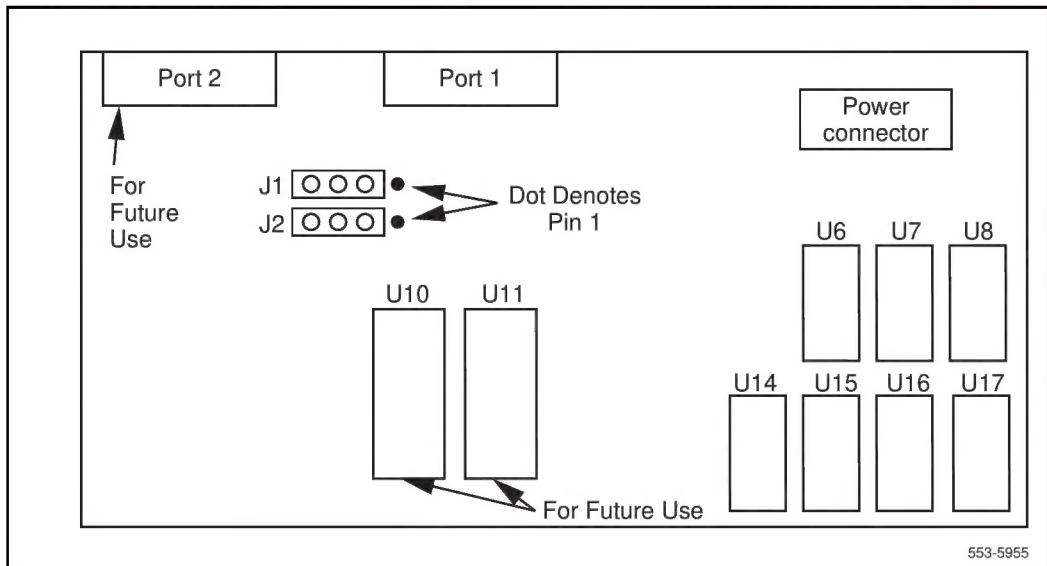


Figure 5
MCU V.35/RS-232 jumper locations

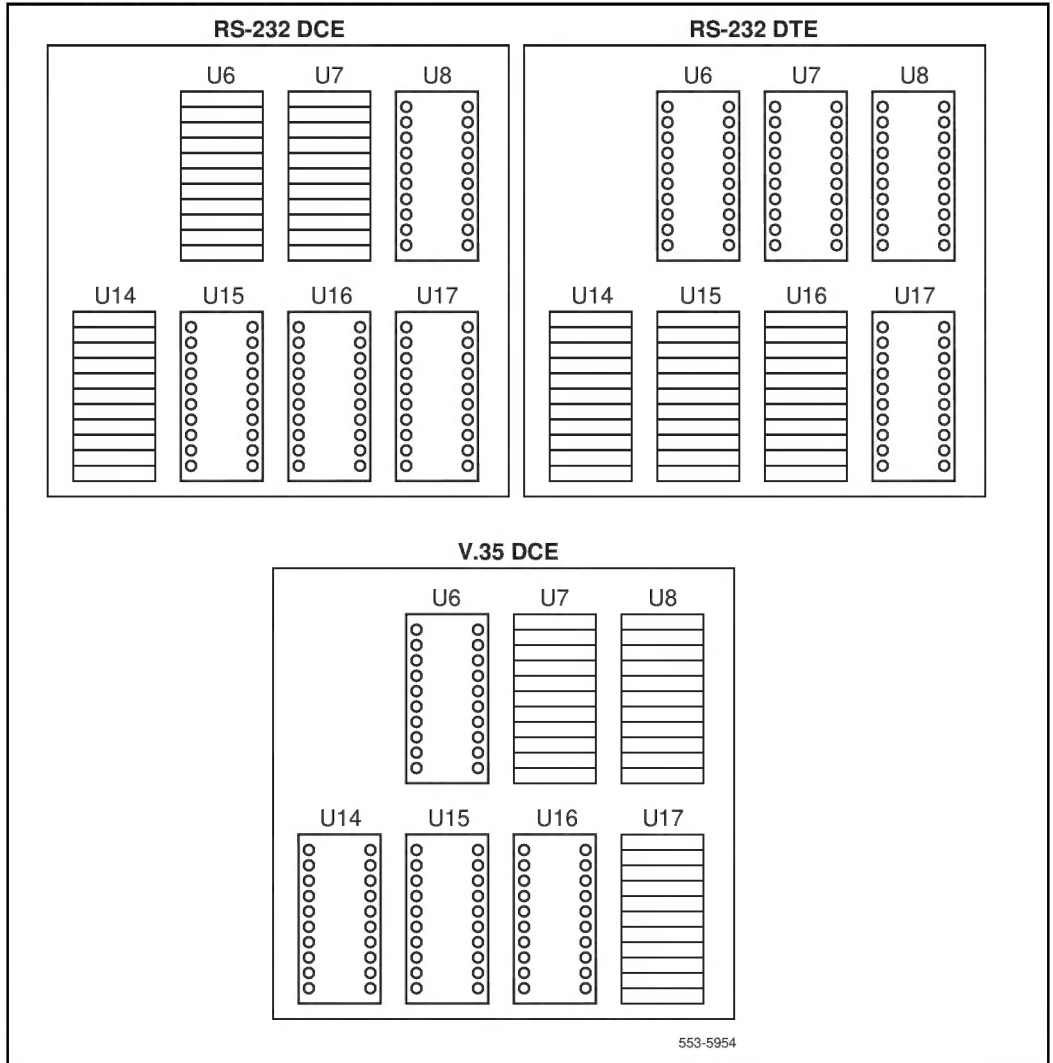
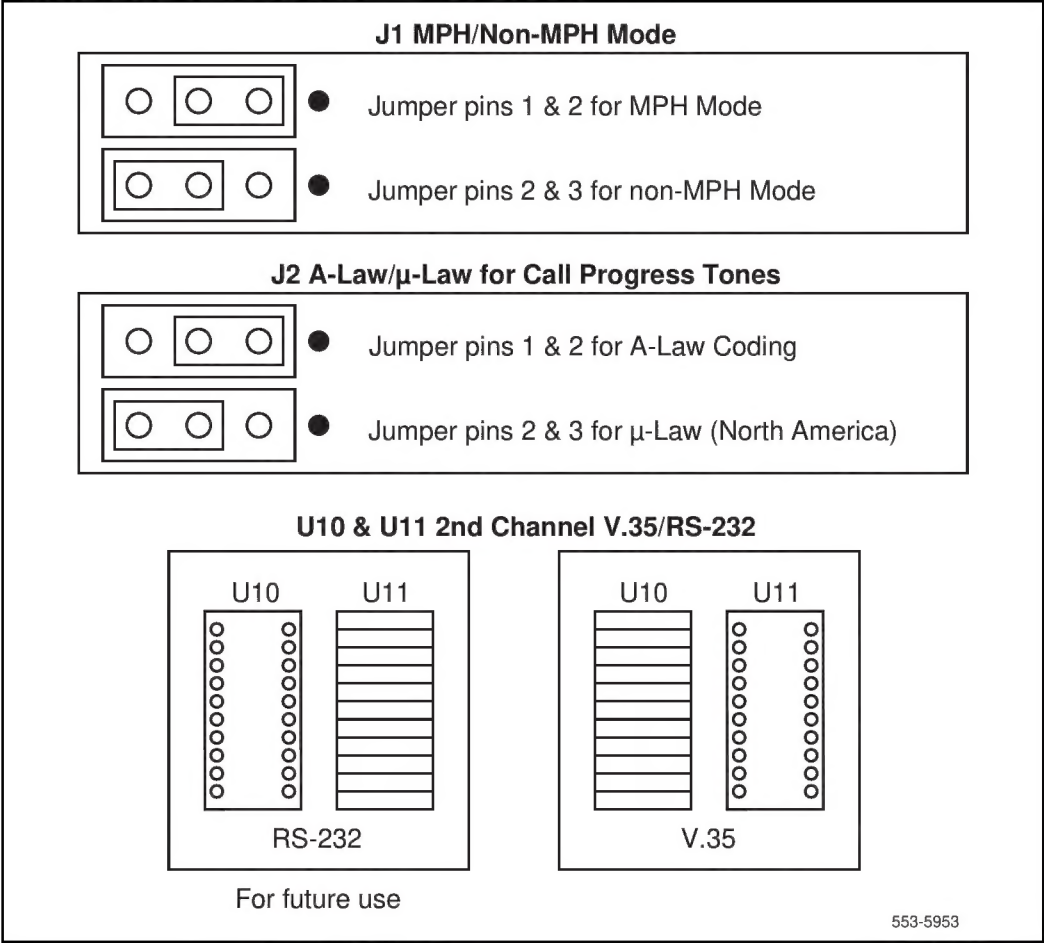


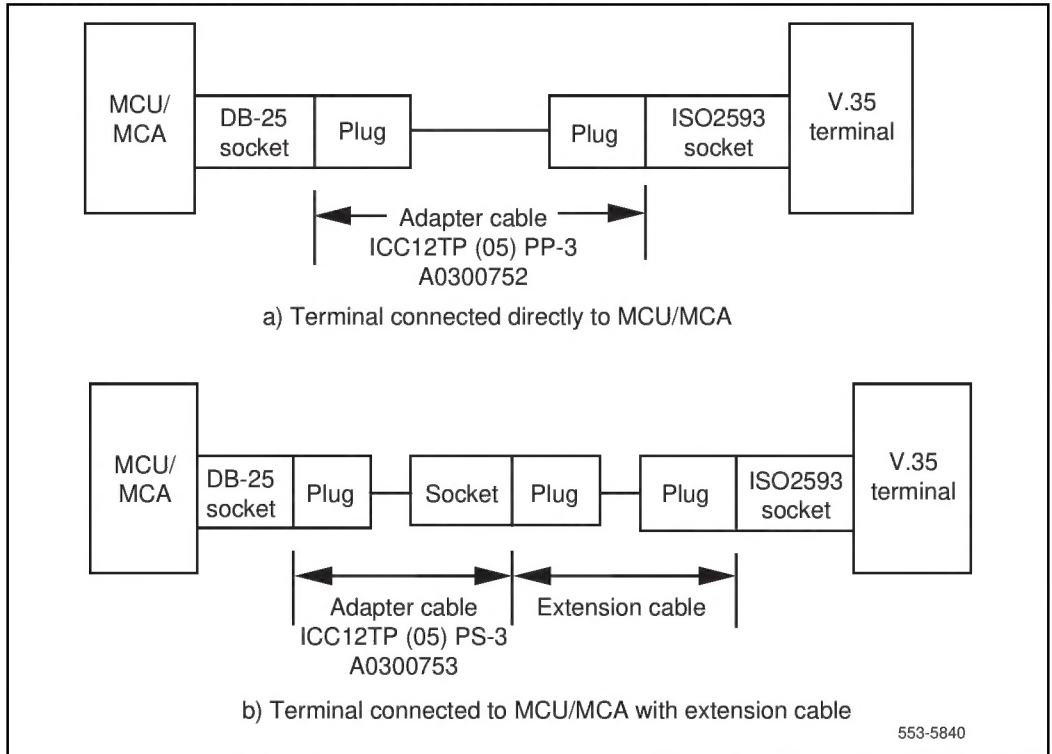
Figure 6
MPH/non-MPH and A-law/ μ -law jumper locations



Adapter cable

An adapter cable converts the ISO-2110 connector into an ISO-2593 (34-pin connector) as shown in **Figure 7**.

Figure 7
MCU/MCA with adapter cable connection for V.35



For a DTE equipped with female ISO-2593, Adapter cable number A0408928* is required.

For a DTE equipped with male ISO-2593, Adapter cable number A0408927* is required.

Note: The A0300752 or A0300753 cables are still supported unless used with applications similar to IBM front end.

Cabling

The physical capacities and provisioning requirements of data feature hardware must be met upon installation. **Table 9** lists cabling and environmental requirement and limitations. No special installation tools are needed.

Table 9
Cabling capabilities

Allowable cabling	Type D PVC inside wiring cable PIC for outside use only		
Maximum separation distances			
MCU/MCA to DTE	Distance consistent with EIA RS-232 cable loading specifications. Note that in some cases the above limitations may be exceeded with no adverse effect on MCU/MCA operation.		
Distance (by cable type)			
MCU/MCA to DLC	PIC outside	PVC inside	Gauge
	4000 ft. (1220 m)	4000 ft. (1219 m)	22 AWG
	3500 ft. (1070 m)	2900 ft. (884 m)	24 AWG
	2000 ft. (610 m)		26 AWG
	2500 ft. (760 m)	2500 ft. (760 m)	22/24 mixed
	1500 ft. (460 m)	1200 ft. (370 m)	24/26 mixed

DTE interface

The MCU/MCA provides a 25-pin connector (that conforms to ISO-2110) that mounted in the rear on the housing.

If an RS-232C cable connects the MCU/MCA to an ADM3 terminal, disconnect pin 22. (The ADM3 enters test mode if pin 22 remains connected.)

When the MCU/MCA is connected to a VT100 terminal, a break on the terminal drops DTR. The MCU/MCA does not display the released message. Display the prompt by forcing DTR on the MCU/MCA.

When the MCU/MCA is connected to a VT102 terminal, a break on the terminal drops DTR. The MCU/MCA does not display the released message.

No data should be sent to MCU/MCA when the MCU/MCA is idle, in the asynchronous mode (when there is no active call). The user must stop the data flow from the DTE before connecting it to the MCU/MCA.

Configuration

Hardware provisioning capacities follow:

Item	Comments
MCU/MCA	Each MCU/MCA is connected to a data port of an ISDLC/XDLC
MCU/MCA terminating on ISDLC/XDLC	No voice TN with MCU. Refer to LD 11.

Field-replaceable items

The table below lists items that can be replaced in the field.

The related hardware is installed in different basic configurations with equipment allocated as follows:

- | | |
|---|--|
| 1 | MCU includes power supply (NTND36AA) or MCA (NT2K65XH) |
| 1 | QPC578 or NT8D02 port |
| 1 | NE 25MQA2A (A0237451) RS-232 cable (MCU–DTE) |
| 1 | NPS 50220-03L5 (A0336823) power supply |
| 1 | NPS50318 wall jack, 7 ft (2 m) A0346862 |

Note: If the MCU is specifically configured for V.35 interface, an adapter cable is needed (see [Figure 7](#)).

- | | |
|---|---|
| 1 | Plug to plug adapter cable ICC12TP (05) PP-3, 5 ft. (1.5 m), A0408928. V.35 male to male adapter cable. |
| 1 | Plug to socket adapter cable ICC12TP (05) PS-3, 5 ft. (1.5 m), A0408927. V.35 male to female adapter cable. |

The Meridian 1 recognizes the MCU/MCA port as a Meridian Modular Telephone. Enter data hardware information into memory using LD 11.

Note: The A0300752 or A0300753 cables are still supported unless used with applications similar to IBM front end.

MCU/MCA LD 11 administration summary

Table 10 describes the LD 11 prompts used for configuring an MCU/MCA in non-MPH mode.

Table 10
Prompts for configuring MCU/MCA in non-MPH mode (Part 1 of 2)

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	2006, 2008, 2216, 2616	For MCA.
	MCU	For MCU (supported by release 18 and later).
MPHI	NO	(MCU only). Respond NO for non-MPH.
CLS	DTA	Used to select a data terminal.
TOV	(0)-3	Inactivity timeout: 0: No timeout 1: 15 minutes 2: 30 minutes 3: 60 minutes
DTAO	MPDA, MCA	Data option (supported by release 18 and later). Prompt does not appear for an MCU. MPDA: MCU/MCA always uses DM-DM protocol. Protocol conversion to and from T-Link is always performed by the protocol converter which resides on the DTI or PRI card. PSDS can only be used if both ends are specifically configured for PSDS mode (no protocol step through). MCA: MCU/MCA is capable of using DM-DM or T-Link protocols. The protocol converter on the DTI or the PRI card is turned off and MCU/MCA performs the conversion. Timed protocol step through to PSDS is also operative. If the called or the calling side is in PSDS mode, the other side will automatically step through to PSDS mode.

Table 10
Prompts for configuring MCU/MCA in non-MPH mode (Part 2 of 2)

Prompt	Response	Description
PSEL	DMDM, TLINK	Protocol selection. Sets the primary protocol to be used by MCU/MCA. Does not appear if DTAO=MPDA.
OPE	YES/(NO)	Operating parameter change. For a complete list of the operating parameters, refer to the LD 11 section of the <i>X11 input/output guide</i> (553-3001-400).
The MCU/MCA feature keys should be programmed as follows:		
KEY 0	SCR xxxx	DDN
KEY 3	ADL	Autodial
KEY 4	RGA	Ring Again
KEY 5	SCC yyyy	Speed Call
KEY 6	DSP	Display (MCU only).

Table 11 describes the prompts used for configuring an MCU in MPH mode.

Table 11
Prompts for configuring MCU in MPH mode

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	MCU	Select MCU for MPH operation.
MPHI	YES	Select the MPH option
OPE	YES/(NO)	Consult the MPH requirements for setting up the operating parameters.

Installing and removing the MCU

Installation and removal procedure are provided in detail in [Procedures 46](#) and [47](#). Disconnect the MCU from the network by disabling the database port with LD 32.

Installation and removal procedures

These procedures require the following materials:

- NTND36AA (MCU) with power supply and line cord to wall jack.
- XDLC/ISDLC port.

The factory sets the MCU in RS-232 mode, non-MPH, and asynchronous.

Note: Always connect the power supply plug to the MCU before connecting it to the wall outlet.

Procedure 46 **Installing the MCU**

- 1** Ensure that the MCU is not powered up.
- 2** Install XDLC in IPE self or ISDLC in EPE shelf.
- 3** Make the cross-connections and ensure that the pin numbers are correctly connected.

There should be no bridge taps on the line.
- 4** Designate the cross-connections.
- 5** Use LD 11 to update system memory for the MCU or the DLC. No voice should be configured for MCU TN.

For detailed information, see *X11 input/output guide* (553-3001-400).

Note 1: If the MCU is connected to an ISDL/CDL port that is configured as a Meridian Modular telephone with a data option, the MCU may work for several minutes and then malfunction when it receives the first lamp audit message from the switch. To avoid this problem, ensure that no voice TN is configured for the MCU TN.

Note 2: In addition, ensure that the following restrictions are observed.

CLS =	DTA	Data Terminal
CLS =	WTD	Warning Tone Denied
	Key 0	DN
	Key 1	Reserved
	Key 2	Reserved
	Key 3 *	Autodial (optional)
	Key 4	Ring again (optional)
	Key 5	Speed Call (optional)
	Key 6**	Display (DSP) (optional)

* Key 3 is required for autodial or hot line feature.

** DSP requires that class of service be updated to ADD.

- 6 Plug the power supply connector to the MCU.
- 7 Plug the power supply into a commercial 110 V ac outlet.
- 8 Test the MCU by placing a data call.

Procedure 47

Removing the MCU

- 1 Use overlay 32 to disable the port connected to the MCU.
- 2 Unplug and disconnect the power supply.
- 3 Remove the connections from the MCU to the:
switch equipment
DTE

For more information about this step, see **Procedure 46**, Step 3.
- 4 Remove the MCU.
- 5 Pack and ship the equipment.

Installing and removing the MCA

Use the following procedures to add the MCA to the M2006, M2008, M2016S, M2616, and M2216ACD telephones and connect the MCA to your terminal.

CAUTION

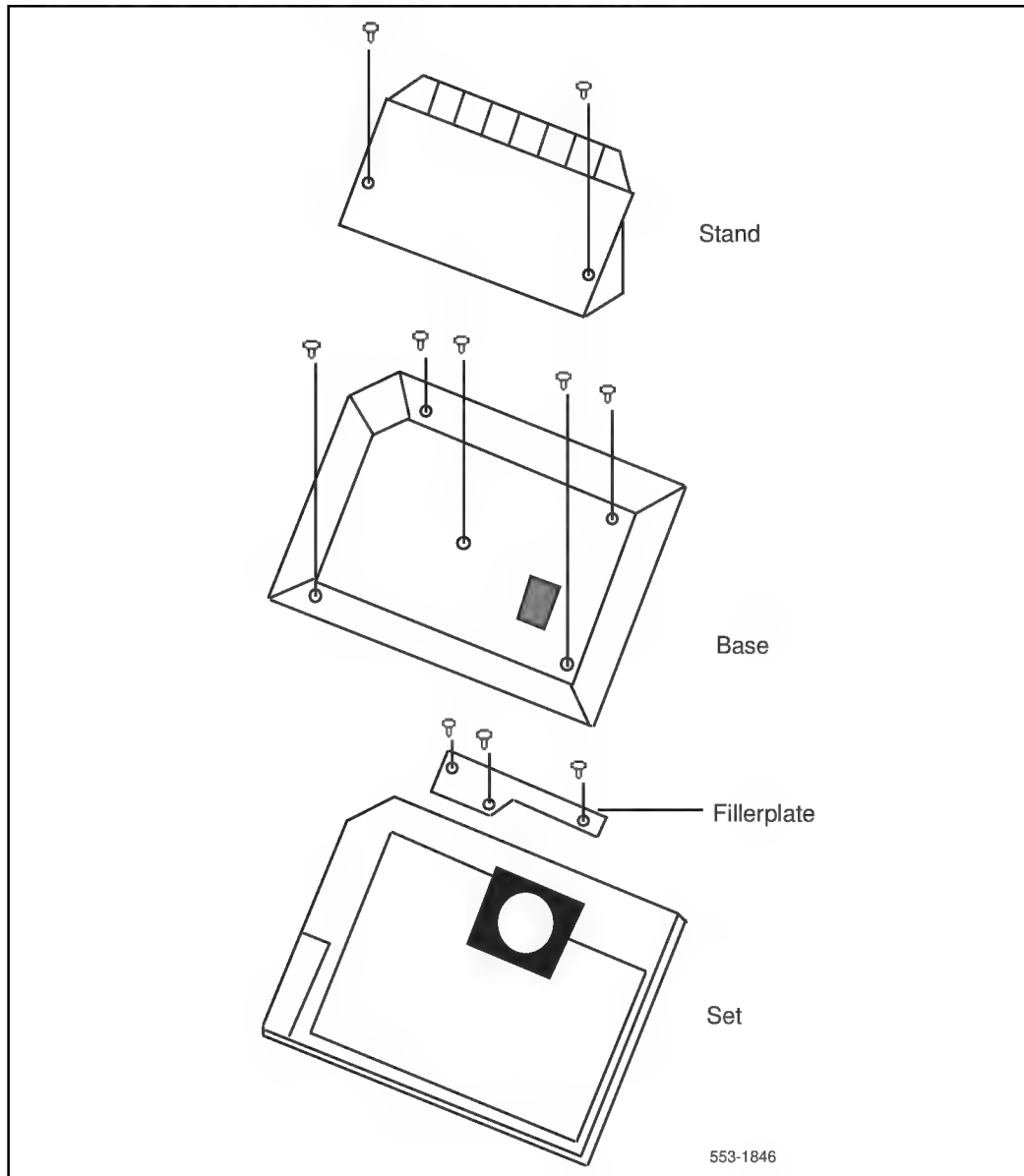
Use only the line cord provided with your Meridian Modular Telephone when installing and removing options. The acceptable line cord is A0346862.

Figure 8 shows an exploded view for reference when dismantling the telephone to get at its internal components. Some telephone types are slightly smaller than the M2616 and do not have the center screw in the base, but otherwise are the same. The center screw may not be required.

Beginning with X11 release 18, data programming can be implemented in the MCA through a service change (LD 11) as well as the keypad. X11 releases 14 through 17 support data commands on the keypad only.

When using the MCA for synchronous data connections, configure the telephone with a display option to view the data parameters.

Figure 8
Exploded view of the M2616/M2016S/M2216ACD telephone



Procedure 48**Installing and removing the Meridian Communications Adapter****CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

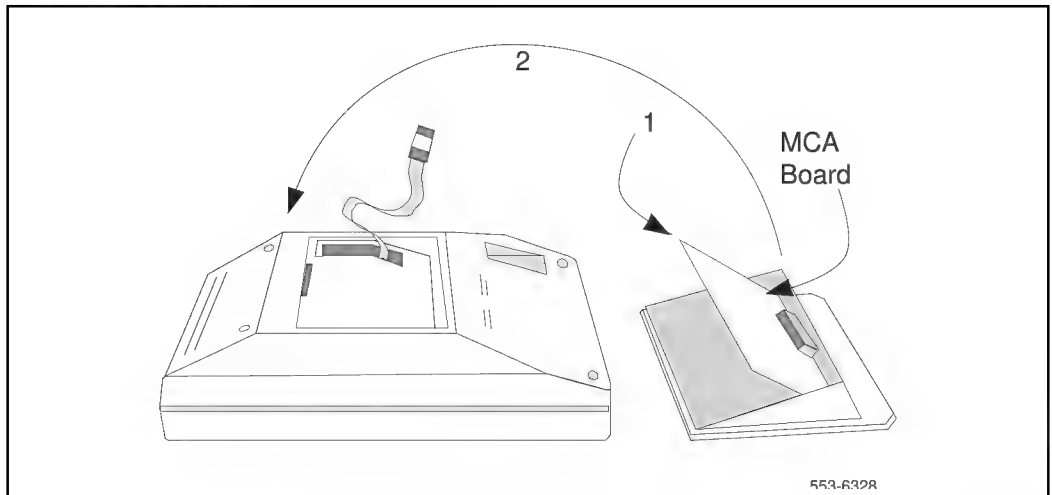
If you have a NT9K phone or the NT2K with date code of January 1998 or later you do not need to install a Power Option board to operate the MCA.

- 1** Remove the handset and place the telephone upside down on top of a level, solid work surface (a desktop, for example) covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2** Disconnect all cords from the telephone.
- 3** Remove the footstand.
 - For NT2K and NT2K with date code prior to January 1998 remove the two screws from the footstand assembly and unsnap the footstand by pressing inward at the back of the footstand where it meets the base and pulling upward.
 - For NT9K and NT2K with date codes of January 1998 retain the footstand, skip to **Procedure 10 on page 78**.
- 4** If the telephone is not equipped with the Meridian Programmable Data Adapter (MPDA) or Meridian Communications Adapter (MCA), go to **Procedure 6 on page 78**. If you wish to replace an existing MPDA or MCA, carefully disconnect the end of the 8-pin TELADAPT jack plugged into the telephone by pressing firmly on the latch-tab and slowly lifting up.
- 5** Turn the telephone footstand assembly over and put it in the normal use position. Remove the two self-tapping screws that fasten the MPDA or MCA to the telephone footstand assembly and remove the MPDA or MCA by pulling outward and up. Go to **Procedure 11 on page 79** to replace the MPDA or MCA.

Note: To remove the footstand from the base, press in the back edge of the footstand as you lift it from the base.

- 6 Remove the back covering of the phone base by removing the four screws holding it in place.
- 7 If the NTZK or the NT2K (with date code prior to January 1998) phone set is equipped with a Power Option board and/or cable, you must remove the Power Option board and/or cable before installing the MCA.
 - Remove the two small screws from the Power board (near the top) and set them aside.
 - To disconnect the Power Option board from the NTZK telephone, grasp the board firmly on each side and slowly rock the board while applying upward pressure, until it is released from the 2X7 pin connector.
 - To disconnect the NT2K Power Option board from the set, simply remove the screws from the base and lift the board out of the set and disconnect and remove the ribbon cable from the 2X7 pin connector.
- 8 If the phone is equipped with the External Alerter board, you must remove it before installing the MCA with redesigned footstand.
 - The External Alerter board is located at the right center of the telephone.
 - Remove the screws from the board, grasp the board firmly on each end and pull upward to remove it from the 2X3 pin connector.
- 9 Install the Jumper board onto the 2X7 pin connector inside the phone base.
 - If the phone set did not have a Power Option board installed on the NT2K or the NTZK then there will be 2 Jumper plugs on the 2X7 connector. Remove them before installing the Jumper board.
 - The redesigned footstand will have 2 jumpers. Use the black one for the NT2K phone and the brown one for the NTZK phone.
- 10 Remove the knockout section in the rear of the telephone footstand assembly by using a screwdriver to break plastic tabs holding it in place. After removing knockout clean area of any small fragments of plastic..

Figure 9
Installing the MCA



- 11** For MCA, set option plugs to the required configuration, RS-232 or V.35. The factory default is RS-232.
- 12** Tilt the MPDA or MCA circuit board up and insert the DB-25 connector socket into the breakout section.
 - Then slide the board connector end-first under the tabs in the footstand assembly and position it over the locating pins.
 - Position and lower it completely onto the telephone footstand assembly.
 - Insert the two self-tapping Phillips-head screws supplied with the MPDA or MCA into the mounting holes and tighten them with a #1 Phillips screwdriver.
- 13** Plug one end of an 8-conductor line cord supplied with a TELADAPT adapter in the jack J1 of the MPDA or MCA (latch tab facing down) and plug the other end of the line cord into the data jack in the base of the modular telephone. Make certain the latch tab of each cable end is firmly snapped into place.
 - Insert the two self-tapping Phillips-head screws supplied with the MPDA or MCA into the mounting holes and tighten them with a #1 Phillips screwdriver.

- 14 Carefully route the excess cable so that it will not become pinched between the footstand and base.
- 15 Reassemble the base and footstand assembly sections, ensuring that the footstand is firmly seated on the base.
- 16 Tighten the screws,
 - Reconnect all cords, including the handset cord and the new wall transformer.
 - Place the telephone in the normal operating position.

Note 1: Place the label supplied with the MPDA or MCA on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

Note 2: If an ADM3, ADM5, or ADM11 terminal is used in conjunction with the DB-25 connector-C interface connector in the Asynchronous Programmable Data Adapter, pin 22 in the DB-25 connector cable must be disconnected. These ADM terminals will go into test mode if this pin is not disconnected.

Procedure 49

Connecting the data terminal

- 1 Connect the DB-25 connector-C interface connector from the data terminal to the matching header connector in the back of the modular telephone.
- 2 Insert the two captive screws in the connector body into the threaded holes in the header connector and secure tightly to prevent accidental disconnection during data terminal operation.

Power Supply Board

Note: The Power Supply Board is no longer needed for the installation of the Meridian Communication Adapter (MCA) for phones with date code of January 1998 or later. For phones with a date code prior to January 1998 the MCA gets its power from the optional power supply board, however the MCA can be ordered with the redesigned footstand, eliminating the need for an optional power supply board on the older phone sets.

If you have an existing Power Option board in your phone set, remove it prior to installing the MCA with the redesigned footstand.

Use **Procedure 50** to add a Power Supply board to the telephone for connection to a transformer or closet power supply. When installing an MCA or MPDA to NTZK or NT2K phone sets with a date code prior to January 1998, a Power Option board is required along with an additional power source.

When installing an MCA in an NT9K or NT2K phone set with a date code of January 1998 or later, a Power Option board is not required.

CAUTION

Connect the optional Power Supply to your Meridian Modular Telephone only. Equipment damage may result from incorrect connections. Both the closet power supply and the transformer are for use with the Meridian Modular Telephone only.

Procedure 50**Installing and removing the Power Supply Board****CAUTION**

Before handling internal components of telephones, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1** Remove the handset and place the telephone upside down on top of a level, solid work surface (such as a desktop) covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2** Disconnect all cords from the telephone.
- 3** Remove the two screws from the stand assembly and unsnap the stand assembly by pressing inward at the back of the stand where it meets the base and pulling upward.
- 4** If the telephone is equipped with a Meridian Communications Adapter (MCA), unplug the data cable from telephone's base jack.
- 5** Remove the screws securing the base of the telephone to the top cover. Remove the base and set it aside.

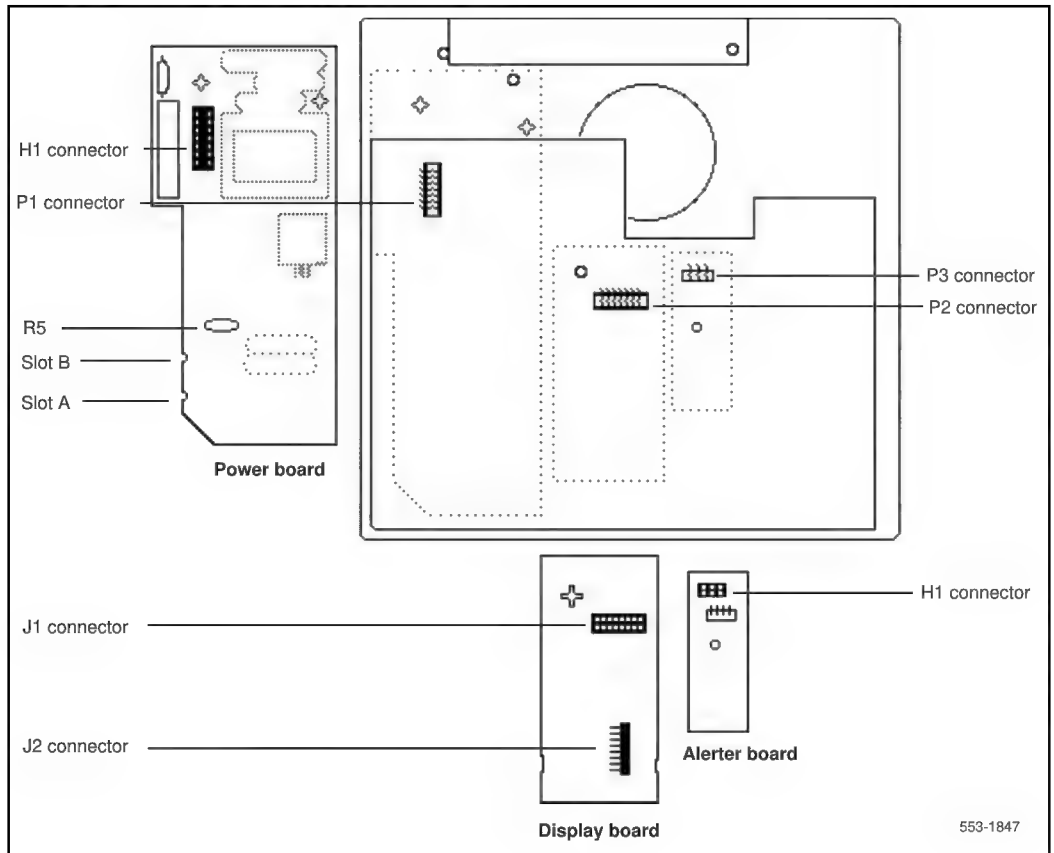
- 6 If the telephone is equipped with a display, disconnect the display ribbon cable from the display board and move it out of the way.
- 7 If the telephone is not equipped with the Power Supply Board, remove the jumpers from P1 connector pins on the Main Board. Go to step 9.

 If the telephone is equipped with a Power Supply Board, go to step 8.
- 8 The Power Supply Board is located on the left side of the telephone. Remove two small screws from the Power Supply Board (near the top) and set them aside. Grasp the board firmly on each side. Work the board loose from the connector by slowly applying upward pressure to alternate sides until released.

 If you are not replacing the Power Supply Board, place the jumpers (AO288529) connecting the bottom two sets of pins on the P1 connector.
- 9 Place the Power Supply Board so that the alignment pin on the telephone fits into Slot A or Slot B (depending on telephone set) on the board (see [Figure 10](#)). Align the mounting holes in the board (near the top) over the mounting holes in the telephone and carefully press down so that the H1 connector on the board slides onto the P1 pins.
- 10 Take the self-tapping Phillips head screws supplied with the Power Supply Board and install them into the mounting holes. Tighten firmly with a #1 Phillips screwdriver.
- 11 If the telephone has a display, reconnect the display ribbon cable.

 Note: Do not allow R5 on the Power Supply Board to become bent during this procedure.
- 12 Replace the base. If the telephone is equipped with an MCA, reconnect the data cable to the base telephone jack and replace the stand (ensuring that the MCA cable does not get pinched between the base and stand). Make sure the stand is firmly seated to the base.
- 13 Tighten all screws, reconnect the line cord, and place the telephone in the normal operating position. Place the label supplied with the Power Supply option on the bottom cover of the telephone for tracking purposes.
- 14 Connect the telephone to a local transformer or closet power supply as shown. Refer to *Meridian 1 telephones description and specifications* (553-3001-108) for requirements.

Figure 10
M2006/2008 telephone and option boards



Maintenance

Two basic sets of diagnostics address asynchronous and synchronous connections.

Troubleshooting asynchronous problems

Symptom:

The MCU is not responding.

Check that the power supply (MCU) is plugged in.

Symptom:

You cannot make a call.

Operate the FORCE DTR key on the MCU and verify that the DTR LCD in the Program Key command 63 screen is on.

Symptom:

The LED stays on.

Replace the MCU.

Symptom:

Garbled characters appear along with the messages CALL CONNECTED and SESSION STARTS.

If you are using an RS-232 cable to connect to the MCU/MCA to an ADM3/5 terminal, make sure that pin 22 is disconnected.

Symptom:

No response when you type <CR> or AT at the terminal.

- 1** Press Program key and dial 28 to make sure you are in terminal mode.
- 2** Make sure your PC or terminal's power is on and you are on-line.
- 3** If the equipment connected to your MCU/MCA is not configured as Data Terminal Equipment, you will need to connect using a null modem cable.
- 4** Make sure the MCU/MCA is receiving external power. Check to see that the power cables are connected properly and the external power supply is turned on.

- 5 If you have a display on your phone:
 - Press the Program key and dial 63 to get into EIA Monitor mode.
 - Check to see that the MCU/MCA is receiving signals from your terminal by watching the RXD indicator on the display while entering carriage returns on the keyboard.
 - If the indicator flashes, the connection is correct. If not, check the cable to make sure it is standard RS-232 and is properly connected.
- 6 Press Program key and dial 62 to ensure that the MCU/MCA is in the asynchronous mode). Press Program key and dial 20 to change to the asynchronous mode.
- 7 For MCA, if the unit does not have a display, press Program key and dial 20. If you hear a beep, the MCA is in synchronous mode. Change the baud rate to an appropriate asynchronous rate (Program key and dial 22), then press Program key and dial 20 to switch to asynchronous mode.
- 8 Press Program key and dial * to ensure that the MCA is in the idle mode. Press Release key to ensure that the MCU is in the idle mode.

Symptom:

The RELEASED prompt is not displayed when you disconnect the call.

Some terminals may drop the DTR with a break. If this happens, RELEASED is not displayed.

Symptom:

The prompt CALL CONNECTED.SESSION STARTS is followed by RELEASED.

Check the configuration parameters of the far end data device. If they do not match those of your MCU/MCA, the call will be dropped. You will need to change the parameters of your MCU/MCA to match the end data device.

Symptom:

Garbled prompts are sent to your terminal when you type <CR>.

Enter a period (.) followed by <CR> to perform an autoparity.

Symptom:

You are connected to a host computer, but get no response when you try to log on.

- 1 First, release the call.
- 2 Turn on Remote Loopback and make the call again.
- 3 Type some characters at your terminal. If they echo back and appear on your terminal, the problem is with the far end data device. If the characters do not appear on your terminal, the problem is with the MCU/MCA.
- 4 Call your telephone system administrator.

Symptom:

When making a data call from the initial prompt (or Main menu) in keyboard dialing, you see the prompt CALLING, but no number appears. After 30 seconds you see the prompt NO SYSTEM RESPONSE.

- 1 First, hold down the break key(s) for two seconds, enter <CR> and try again to make the data call.
- 2 If the problem persists, your MCU/MCA is probably disabled. Call your telephone system administrator.

Note: No data should be sent to MCU/MCA when the MCU/MCA is idle in asynchronous mode (when there is not active call). You must stop the data flow from the DTE before connecting it to the MCU/MCA

Troubleshooting synchronous problems

Connect a bit error rate tester to the MCU/MCA. Turn Remote Loopback on (P38) and call the far end data module to check the path integrity. If the MCU/MCA could not send data and no asynchronous terminal is available, replace the MCU/MCA.

If an asynchronous terminal is available, try testing the MCU/MCA in asynchronous mode. For assistance troubleshooting in asynchronous mode, see [“Troubleshooting asynchronous problems” on page 84](#). If the MCU/MCA still fails, replace it.

Troubleshooting the MCA

A few special troubleshooting tips apply only to MCA units:

- Check the LED in back of the telephone to see if it is flashing. (If it is steady, reconfigure the MCA in the system or replace it. If LED does not light, the telephone needs external power.)
- Ensure that the data cable from the terminal or PC is connected to the MCA.
- If a display is attached to the MCA, check data parameters using *Meridian Communications Adaptor user guide* (P0744323).
- Ensure that the transformer is plugged in to the closet power.
- Check that the MCA cable connects to the telephone and has not been pinched.

Troubleshooting the MCU

The LED on the MCU's cover indicates the functional status as well as the power-up diagnostics results. Power up the MCU while observing the LED.

- If the LED flashes (two counts on, one count off) and then turns off and stays off, the MCU has passed the self test and established communication with the Meridian 1. This indicates the MCU is fully functional and ready. At this point, if a call is made to/from the MCU, the LED will go on upon call connection and will stay on for the duration of the call.
- If the LED does not turn on and none of the MCU functions respond, replace the power supply and try again.
- If the LED does not turn on but the MCU functions properly, the LED is not functional. Replace the MCU.
- If the LED flashes (one count on, one count off), it indicates a self test failure. Replace the MCU.
- If the LED flashes (two counts on, one count off) it indicates a loss of communication between the MCU and the Meridian 1. Make sure the line cord is plugged into the MCU and the wall jack.

Far-end loop back check

For a far-end loopback check, establish a data connection between the MCU and any data module, then use an external bit error rate tester to check the path integrity.

Note: It is not recommended to use a hardware loopback plug in synchronous mode.